

# **Patent Application of Ming He**

**For**

## **Multi-functioned insert Mold Board System**

### **Background:**

This invention relates to "Multi-functioned insert mold board". The peculiarity of the invention is that the user may build up many kinds of object by using the said board, which may be used for various purposes, including civil engineering, family appliances, model, teaching, packaging, toy, etc.

After a thorough survey to the marketing, the interrelated patent data, information and the similar products, I noticed that the function of those products is simplex. They are used as model, or toy. They simply serve one aspect. I noticed that the changes to the shapes are quite limited and they are lack of a function of switching or changing.

U.S. Pat No. 05, 354, 224 are composed by cubes or pyramids. They make sole change in shape only.

U.S. Pat .No. 06, 015 , 150 is solely changed and functioned. They are hard to make.

The ball shaped US Pat No. 05, 104, 125 is too complicated. The joint or degree may not be changed. It can only make one change in shape.

The "jigsaw puzzle" used as toy may be shaped as cube or plane. However it can only make into one cube, and it is not strong and steady enough.

A multi-functioned product becomes necessary with functions of both amusement and daily uses. This product may not only be used as model, toy or furniture, but also may be re-organized or refitted when needed. This product may help us greatly in dealing with the 3D and space visualization issues. It helps a lot when there is a divergence between the actual 3D objects and our space visualization. Some 3D model is hard to make, the twist or an object with twisted face for instance. An easy making product with low cost is in need.

A multi-functioned product is in need, which may be formed into different plane figures or various vertical object for fostering the kids' space visualization and train their creative abilities, as well as satisfy the teaching requirements of school (a smooth forward procedure from geometry to vertical-geometry).

The civil engineering also requires an easy making product with low cost, for example model board, tube and models.

This invention may satisfy all said requirements. It is a molding board with low cost and easy to make. The members are some basic geometric figures. The fundamental tenet of my invention is to create various objects by putting the geometric figures together by jointing the teeth on the molding board.

The materials used by this invention are those high resilience and flexible, for example plastic, rubber, paper board, wood board or metal, etc.

The molding board will be manufactured in factory by standardized shapes and sizes.

For special instances, the individuals may make their own molding board at home with some simple tools by cutting holes on edge with equal space, and then connect the pieces together to form specific figures for different purposes.

### **Summary:**

This invitation is accumulates all the virtues. It is new, changeable, low cost and easy making. It is composed of the fundamental geometry figures, which may be connected into different objects by join the tooth on the board together. They may also be separated and refitted again. The degree of the joined object may be adjusted. Appendix may be used to strengthen the molding board, to expand its functions. It is easy to carry around.

### **Drawing:**

FIG1a -- FIG1u are structure composed by basic geometric figures. Adding certain special shaped pieces may restructure them, for example an irregular piece or a shell shaped piece, etc.

FIG1a appears detail of a square molding board.

FIG1b is tooth figure of the molding board.

FIG1c is a triangle.

FIG1d is a parallelogram.

FIG1e is a small square .  
 FIG1f is a trapezoid.  
 FIG1g is a right triangle.  
 FIG1h is an isosceles right triangle.  
 FIG1i is an equilateral triangle.  
 FIG1j is an isosceles trapezoid.  
 FIG1k is a hexagon.  
 FIG1l is a pentagon.  
 FIG1m is a circular.  
 FIG1n is a sector.  
 FIG1o is a hyperboloid.  
 FIG1p is an ellipse.  
 FIG1q is a random graph.  
 FIG1r is a quarter annular.  
 FIG1s is a strip.  
 FIG1t is a staff.  
 FIG1u shows appendix #1.  
 FIG1v is shell mold #1.  
 FIG1w is shell mold #2.  
 FIG1x is twist mold #1.  
 FIG1y is twist mold #2.

FIG2a -- FIG2y show a basic join mold.  
 FIG2a is direct join (regular join).  
 FIG2b is plane joint.  
 FIG2c is cross-join.  
 FIG2d is self-join.  
 FIG2e is spiral-join.  
 FIG2f is staggering-join.  
 FIG2g is spacing join.  
 FIG2h is plane combination.  
 FIG2m is staff-join.  
 FIG2x is rack-join.  
 FIG2i is outer-join (tooth-out).  
 FIG2j is inner-join (tooth-in)  
 FIG2k is expanding and contract joint.

### **Description:**

FIG3a – FIG3s are regular figures. They are joined together by tooth. The joint degree between two pieces may adjust from 0 degree to 360 degree. The degree and shape of the object are fixed when a third piece was put onto the other two pieces.

FIG3a is a hexahedron (cube) formed by six squares.

FIG3b is a pyramid formed by four triangles and one square.

FIG3c is an octahedron formed with eight isosceles triangles.

FIG 3d is an icosahedron (20 triangle) fitted by 20 isosceles triangles.

FIG3e is a cuboctahedron formed by some isosceles triangles and right isosceles triangle (the bold line marked here refers to the hidden joint, namely the raised tooth remains inside).

FIG3f is a dodecahedron (12 pentagons) formed by 12 pentagons (the tooth may be joint together inside or outside).

FIG3g is a sphere formed with pentagons and hexagons.

FIG3h is a random formation by square, large isosceles trapezoid and small isosceles trapezoid. It can be fixed into a vase, a tissue box or a fruit basket etc. at your need.

FIG3i is a figure randomly put square, triangle and some other shapes together. It can be as pedestals, furniture or your kid's storage box. You may change the style or color.

FIG3j is a model also composed by the said molding board. It becomes attractive when colored or put sticks onto it.

FIG3k is formed by 4 hyperboloids and 2 squares. It may be used as pedestals or art craft.

FIG3l (FIG2e) is a tube-shaped object made by girdle piece. It is one of the specialties of this invention. It may be used to turn into a tube at any diameters. It can also form various objects by twisting-joint.

FIG3m is a cylinder build up by a rectangle and 2 circles.

FIG3n is how to make a cylinder by using the cover indicated in the chart. To put a canister inside another one will increase the intensity. It may be used as pedestals or package purpose.

FIG3o is a twist figure fixed by triangles and quadrilaterals.

FIG3p is a global puzzle formed by the said molding board. To prepare N-(certain) piece isosceles trapezoids molding board according to the longitude and

latitude, and two circulars as north pole and south pole. The tooth on each neighbored edge is corresponding to each other. To put the graphed earth pieces together by inner tooth (keep tooth inside the ball). To fix the body by putting onto the supporting strips when necessary as indicated in FIG1u. The earth puzzle helps us to learn about geography and improve our intelligence.

FIG3q is a model formed by shell shaped and other molding boards.

FIG3r is a round tube figure.

FIG3s are models formed by staff and other molding boards.

The tooth on the insert mold board of this invention is indicated in Chart FIG1b. The materials used by this invention are those with high resilience and flexible (for example plastic, rubber, paper board, wood board or metal, etc). The sharp raised tooth makes it easy to join other piece. The concave sizes the same as the tooth top. A small hole is drilled on top of the raised tooth, which has functions of:

- (A) Compressing the volume and making it easy to put the tooth in. It recovers because of the resilience and tensile strength of the material;
- (B) As indicated in Chart FIG1u to embeds layering on to reinforce and lock up the molding board. It strengthens the edge and avoids sliding as indicated by Chart FIG2x;
- (C) Threading through to strengthens the enduring of the object and increase its capabilities;
- (D) To connect and hang the molding board to make a hanging system.

One of the specialties of invention is to build up an object by the material itself as indicated in FIG2d, FIG2e. They may be turned into curves, circulars or from a plane one to vertical one, for example FIG2y shows how to make a taper by connecting the tooth itself, or FIG2d from square into a circular.

The belt piece may be turned into spherical objects with various diameters. It has great potential commercial values, for example they may be used in ventilation system, pillar pouring moldboard, packaging or decorating system. The connections between belts (direct connect, staggering or twisting) may form various beautiful charts. FIG2e, FIG3n and FIG3l

Another specialty of this invention is to connect the pieces indirectly (T-shaped), which enable the product practical functions. It turns stronger and more solid as Indicated in Chart FIG2g.

On basis of the plane joint, some basic figures may be changed into a more complex figure as indicated in Chart FIG2h by putting more molding board to enlarge, lengthen or increase the object. In someway, the molding board is similar with the "Magic" board, but it makes more changes besides the "Magic" board's "plane change". The molding board can be turned both plainly and vertically. What's more, you can

make more connection between the finished objects as indicated in Chart FIG3a – FIG3s, which not only helps the kids but also offers amusement to the adults.

One more specialty of the invention is crossing-joint. The special round teeth, holes and materials allow compressed spaces when joint the molding boards. This peculiar performance adds itself more practical usages and endurableness as indicated as in Chart FIG2c.

Another peculiar performance of the molding board is that you may join the pieces by placing the teeth either inside out or outside in as indicated in Chart FIG2i, FIG2j, FIG2k and FIG5. Different ways of joining the board affect the forms of your targeted objects and the movement of the flashboard. As indicated by Chart FIG2k, the flashboard may be overlapped. They may also be overlapped in both directions indicated in Chart FIG5. We may use this particular performance to make a lot of 3D objects. They may be adjusted up and down, overlapped or expanded. This peculiar performance can be used by commercial, civil engineering or in our life, which is what you can't find in other products. FIG5 shows this peculiar performance.

The insert mold board can make curtains. Chart FIG5 is one of the ways to make a curtain. The bolded line indicates outside joint (namely the teeth is facing us) and the dotted line refers inside joint (the teeth is away from us). We put the boards together one by one by threading the holes on edge. A curtain was made as showed by Chart FIG5a. You may adjust the directions of the curtain by pulling the thread. It may be pulled up and down, left or right to adjust the sunlight, the brightness, the sight of your likeness as indicated in Chart FIG5b and FIG5c; Left or right as in Chart FIG5d and FIG5e. Chart FIG5f shows us that the board can be moved to left and right, up and down or overlapped when we release one edge of the board. This peculiar performance may be used to make gates or waved objects.

To adjust the space or number of the teeth by various purposes or requirements when produce the molding board. It is fine as long as the molding boards are consistent with each other.

FIG4 shows us how to put three pieces of molding board together.

When we make a three pieces connection, we may connect them in a regular way (equal teeth space), or as showed in FIG4 with teeth 41, 42 or 43. The merit of it is that there is less blocking when joining the boards. The joining is smooth and easy. And the angle of the boards is easy to adjust.

The corresponding teeth can also be made for the four, five or six pieces of molding boards.

Another important specialty of the molding board is to make large 3D objects. FIG7a and FIG7b show us how to make spheriform or triangular pyramid by triangle molding boards:

- a. Decide the object you are going to make;
- b. Mark the surface of the targeted object off by triangles;
- c. Use special triangles on edge or the special positions;

d. When you finished the basic structure, you may now start your fine processing, for example, you can create a double layer triangle system by connecting the tops with a lever; or build up a multi-triangle system as needed by using triangle molding boards. FIG7a.

On basis of this theory, other shapes of molding boards will make all kinds of objects with different functions.

The function of the lever is quite useful for our life and civil engineering. The molding board used in the civil engineering may be metal, cement or wood. It is easy making and low cost.

All kinds of structure systems can be built up when we put onto more appendixes. FIG8, FIG9 and FIG10 are examples of the said functions. It is very simple. As indicated, a requested object was made when you insert the molding board into lever 82 or 92, and connects them with 91 or 81 (See Chart FIG8b, FIG8c, FIG10a and FIG10b). We may put strips onto the levers or the joints to strengthen their endurance. It helps us to make screen, partition, closet, and furniture, exhibit model and decorations. It surprises you and creates you different staff when you are careful enough at choosing the molding board and the colors. The user can put wire or rope into lever 82 or 92 jointing at 81 or 91 to make the objects stronger and firmer if necessary.

The same as the said molding board, they can also be randomly reformed. They are multi-functioned and low cost.

### **Operation:**

Get the necessary insert mold board for the object you are going to make(FIG1). Put them together by joint the teeth into holes (FIG2), following the step, you'll build up the object you wish to make (FIG3-FIG10).

Add strips (FIG1u) to lock the boards when necessary as indicated in FIG2x. Remove the board one by one when you don't need it. Start from the very edge. You can build a new object by using the removed boards.

To use the following method to build a fixed object:

- A) To prepare an abject with the said molding board;
- B) To fix the joints by welding or pasting;